

Cell and Molecular Biology

BIOL 3310.001
3 units

Tu, Th 3:30 – 4:45 PM

Instructor: Dr. Jamila Newton
Spring 2016

Syllabus

Prerequisites: *BIOL 1050, BIOL 1150, CHEM 1100, CHEM 1110, or equivalents.*

Textbook: Becker's World of the Cell. 8th Edition. Jeff Hardin, Gregory Bertoni, and Lewis Kliensmith. (Pearson) ISBN: 9780134013305

Course Intentions: The fundamental unit of life is the cell; therefore cell biology forms the base upon which all modern biology and medicine is built. This course will emphasize the study of eukaryotic cell structure and function, including chemical components of cells, membrane transport, cell signaling, flow of genetic information, cell growth and cell division. Experimental techniques used in understanding cell biology will be discussed along with the cellular basis of human diseases.

Course Objectives: This course is designed to introduce the principles of cell biology. At the end of this course, students should be able to:

- Gain a conceptual understanding of the molecular basis of various cellular processes.
- Think critically, interpret hypothetical experimental observations based on concepts learned in class, and strengthen problem-solving skills.
- Know how the cell function and structure are related, and understand the similarities and differences between various cell types.
- Understand human health and diseases in context of the basic cellular pathology.
- Hopefully develop the curiosity and desire to further incorporate their knowledge of cellular biology into their everyday lives.

Course Materials and Handouts: Whenever possible, lecture slides will be posted (in pptx and pdf formats) online before each class. Students are expected to bring their own copies of the slides, as well as review them prior to class. In addition to the textbook and class handouts, computer and internet access shall be required for this class. For students who do not otherwise have access to a computer or the internet, computers may be available at several campus locations including the main reading room in the library.

Grades: The total grade will be based out of 350 points.

Assignments	pts vary	All	50 pts
Pop Quizzes	10 pts each	Best 10 of 12	100 pts
Exams	50 pts each	Best 4 of 5	200 pts
Total			350 points

A	A-	B+	B	B-	C+	C	C-	D+	D	F
> 93%	93 - 90	90 - 87	87 - 82	82 - 79	79 - 75	75 - 72	72 - 68	68 - 65	65 - 59	< 59%

Attendance, Absences, and Make-Ups:

- Daily attendance to lecture is **crucial**. Though attendance is not an official part of your grade, there will be graded, **unannounced (pop) quizzes throughout the semester**. These quizzes may be given at any time during the class.

- Unless otherwise noted, **all assignments are due by the beginning of class**. Turning in an assignment ahead of time is highly recommended.
 - Assignments will lose 10% of their grade for each day turned in late (if turned in 15 minutes after the start of class, it is considered a day late).
 - If you are absent, you may email an electronic copy of the assignment before the start of class to the instructor. The email must be received in the instructor's inbox before the start of class. Remember that sending an email does not guarantee that it will be received in time, and last-minute "technical difficulties" are not a valid excuse. In some cases, you may later be asked to provide the original, hard copy of the assignment.
- **There will be no make-ups for assignments, quizzes, exams (including the final)**. If you arrive late to a test (an exam or quiz), you will not be given any extra time. If you miss a test, you will receive a zero. Exceptions may be made in under dire circumstances (with proof), such as:
 - Incapacitating illness or accident on the day of the test. This requires a note from the student's physician (not a family member) or from the University Health Services.
 - Death or imminent hospitalization of an immediate family member or dependent on the day of the test. This requires proper documentation.
 The documentation must explicitly show or state that the illness, injury, or incident occurred during the time of the test. The documentation must be provided within 7 days of the missed test.

Cheating: Cheating is absolutely forbidden.

- Any of the following are considered cheating:
 - **Plagiarism** is defined as using another person's words without quotation marks and/or reference. Although in preparing problem sets you may paraphrase written information from texts or articles, you must use your own words, clearly cite the source and identify the text that was paraphrased, and demonstrate that you understand that information. If you quote directly or nearly directly from a source, you must indicate this with the use quotation marks and cite the source of information.
 - **Copying** answers or using notes while the exam is being administered is considered cheating. Please keep your eyes on your own paper.
 - **Using calculators, other devices, or other material that has not been explicitly allowed** during exams is prohibited. Calculations needed to answer exam questions will require simple arithmetic.
 - **Altering answers** on a graded problem set or exam, then trying to have the grade changed is considered cheating.
 - **False representation** of you as someone else in this course is a gravely serious offense. Signing in, taking quizzes, or completing any course material for another student is considered cheating.
 - **Forging or altering a grade** change form is also a gravely serious offense. The Registrar's Office is wise to this; they carefully check signatures and send copies of all grade change requests to the faculty member.
- A person cheating receives a 0 for that assignment; their name and a description of the offense is sent to the Dean of Students. Cheating offenses are punished by disciplinary probation, suspension, or expulsion. These actions may be noted on your transcript!
- If you think a fellow student is cheating we urge you to discretely tell us about it. We will maintain your anonymity.

Contacting the instructor: Additional office hours with Dr. Newton can be scheduled with in person or via email: jnewton@post.harvard.edu. Please include "Bio 3310" in the subject line of any emails. Unbeknownst to some, Dr. Newton loves conversing with her students, whether it be answering questions about the material, discussing their other curiosities about science, or offering professional advice. **So please, don't be shy.**

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Course Schedule

Assignments, due dates, and additional reading will be posted online with sufficient notice. This schedule is tentative and subject to minor changes. However, the exam dates here will not change.

Date	Week	Topic	Chp.
Jan 28	1	Introduction to the Class; Preview of the Cell	1
Feb 2	2	Chemistry of the Cell; Macromolecules of the Cell	2, 3
Feb 4		Macromolecules; Cells and Organelles	3, 4
Feb 9	3	Review of Organelles; Bioenergetics	5
Feb 11		Enzymes; Review	6
Feb 16	4	EXAM 1	
Feb 18		Cell Membranes	7
Feb 23	5	Membrane Transport	8
Feb 25		Glycolysis and Fermentation	9
Mar 1	6	Aerobic Respiration and Photosynthesis	10, 11
Mar 3		Photosynthesis; Review	11
Mar 8	7	EXAM 2	
Mar 10		Endomembrane System	12
Mar 15	8	Signal Transduction: Neurons	13
Mar 17		Signal Transduction: Receptors and Cell Signaling	14
Mar 22	9	Cytoskeletal Systems	15
Mar 24		Cellular Movement; Cell Adhesions	16, 17
Spring Break Mar 28 – Apr 1			
Apr 5	10	Cell Adhesions; Review	17
Apr 7		EXAM 3	
Apr 12	11	DNA and Chromosomes; DNA Replication	18, 19
Apr 14		Cell Cycle and Mitosis; Meiosis	19, 20
Apr 19	12	Genetic Recombination	20
Apr 21		Gene Expression and The Central Dogma	21,22
Apr 26	13	Regulation of Gene Expression; Review	23
Apr 28		EXAM 4	
May 3	14	Integrating Concepts: Cancer and Tumor Cells	24
May 5		Integrating Concepts: Stem Cells and Genetic Reprogramming	TBD
May 10	15	Integrating Concepts: Cellular Basis of Infectious Disease	TBD
May 12		Integrating Concepts: Specialized Cells and Extremophiles	TBD
May 17	16	Review: Comprehensive	
May 24	FINAL EXAM 2-4pm		